A33 Does the "Scientific Method" Apply to Forensic Science? Should It?

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The purpose of this presentation is to dispel claims that there is a unitary scientific method and that this scientific method should apply to forensic science. The presentation will demonstrate that different sciences have their own methods for formulating problem to investigate and for gathering evidence. The presentation will also show that forensic science is properly classified as a historical science like archaeology rather than an experimental science like chemistry. Finally, the presentation will explore the implications of such a classification for forensic science education.

This presentation will impact the forensic science community by understanding the distinction between "experimental" sciences and "historical" sciences and will also understand the differences in the methodologies employed by these two categories of science. They will also understand why forensic science is properly classified as a 'historical' science rather than an experimental science.

The National Research Council's recent report *Strengthening Forensic Science in the United States: A Path Forward* (National Academies Press: 2009) in discussing forensic science education stated: "Forensic examiners must understand the principles, practices, and contexts of science, including the scientific method." Many scientists and philosophers of science maintain that there is a unitary 'scientific method' that is applicable to all sciences. Some of these scholars believe that all science can be reduced to physics and that the research methods of physics should be applied across-the-board to all sciences. On the other hand, other scholars in the field of science studies (most notably Dean Henry Bauer in his *Scientific Literacy and the Myth of the Scientific Method* (University of Illinois Press: 1994) have argued that there is no unitary scientific method that is applicable to all sciences. For many of these commentators, this view is primarily a pragmatic recognition that different sciences deal with different subject matter and make use of different standards for selection of research problems and for the evaluation of evidence. Psychologists Hilary Putnam and Jerry Fodor have argued that there are logical grounds for dismissing the claim that all science can be reduced to physics. If such is the case, the different branches of science should have distinct logical structures and would have their own "scientific methods."

Professor Carol Cleland has stressed the critical distinction between "experimental" sciences such as physics and chemistry and "'historical" sciences such as astronomy, geology, paleontology, archaeology and evolutionary biology. "Experimental" sciences seek to formulate laws that predict the outcomes of future experiments, while "historical" sciences seek to reconstruct past events from traces left behind. "Experimental" sciences infer effects from causes; "historical" sciences infer causes from effects. While "historical" sciences may conduct experiments that superficially resemble those of "experimental" science, these experiments seek to find traces of past events predicted by specific reconstructions of those events.

Forensic science clearly belongs to the "historical" sciences rather than the "experimental" sciences. All the evidence examined in forensic science laboratories is the result of past events. Forensic examinations are conducted so that investigators can infer what crimes have been committed, who committed them, and how they were committed. In order to accomplish these goals, forensic scientists must sift through the myriad pieces of evidence found at the typical crime scene and determine the forensically relevant items of evidence and the appropriate examinations to perform on them. Such choices are guided by the forensic scientist's understanding of the capability of specific items of evidence to distinguish between various possible reconstructions of the crime.

The classification of forensic science as a 'historical' science has important implications for forensic science education programs. While some forensic scientists (such as forensic anthropologists) have been educated in fields where reconstruction of the past is the norm, most forensic chemists and many forensic biologists come from educational backgrounds that stress the 'experimental' sciences. Consequently, forensic science education programs should place stronger emphasis on historical, reconstructive reasoning. This should be done through the use of simulated or mock crimes which students are called upon to investigate. The mock crime scenarios should include relevant as well as irrelevant evidence and the students should be required to identify the relevant items of evidence, select the most forensically useful methods of analysis, carry out examinations of the evidence, and weigh the likelihoods of different crime reconstructions.

Forensic Science, Scientific Method, Historical Science

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